



**Jan. 22, 2013**



# 101 Fluids and Combustion Facility, MIP & TSC



**ZIN Manager:** Michael Johanson

ZIN Engineering Lead: M.O'Toole

ZIN Operations Lead: T. Wasserbauer

ZIN Integration Lead: C. Rogers

**NASA Program Manager:** Tom St'Onge

**NASA Project Manager:** Bob Corban (Kevin McPherson)



SpaceDOC 101 encompasses the International Space Station (ISS) Fluids and Combustion Facility (FCF) Project and its initial payloads, Light Microscopy Module (LMM) and the Multi-user Droplet Combustion Apparatus (MDCA) have been launched and the flight units are installed on the ISS. The Flight units on the ISS, as well as the units on the ground (Ground Integration Units and the Engineering Development Units) need to be operated and maintained. This Delivery Order is for the operation of the FCF racks on orbit and on the ground, resolution of any anomalies, evaluation of trends, software upgrades, hardware obsolescence evaluation, new hardware development to support future capabilities, verification, and training the crew and operators on the hardware/software. Also, as new payloads are developed for the FCF, analytical modeling and engineering analysis of the interface will be required.



The CIR Flight Unit, along with MDCA, was delivered to the ISS by STS-126 (November 2008). The FIR Flight Unit along with the LMM were delivered to the ISS by STS-128 (August 2009).

Issue	Potential Impact	Action Plan	Resolution Date
HRDL/Rack Lock –ups	Loss of HRDL downlink capability	Develop operational workaround to allow use of HRDL with IOP logging moved to /sd1 hard drive  Develop software patch that eliminates HRDLOS disk writes to /sd0. This resolves the root cause of the file allocation table conflict	<b>Complete</b>  <b>February</b>
FOMA GC manifold re-certification	Loss of GC operations	Develop flight support equipment and procedure for calibration of PT 19, 20, 21	<b>December</b>

- **FLEX2 Science**
  - Continued the FLEX2 Quiescent/Convective Matrix
  - December total is 5 downlink test point ignitions
  - December operation interrupted by CIR HRDL/rack lockup issue
- **ACE Science**
  - Supported ACE s/w enhancement ground testing and CVB PI evaluations
- **Safety**
  - HTV-4 SDP review cycle completed
  - GCIP SDP review cycle completed
  - Drafted the GCIP Fracture Control Summary Report
- **Software**
  - Conducted ERB for LMM/ACE enhancement updates
  - Conducted ERB for IOP/HRDL lock-up s/w patch
  - Updated IPSU reformat procedure, validation pending IPSU drive reformat
- **Integration**
  - Soyuz Pre-ship/SAR completed successfully, FOMA Cal unit shipped
  - Prepared and presented FCF Life Extension presentation to SWG
- **Hardware deliverables**
  - Completed EMI analysis for MDCA Color Camera
  - Completed assembly of the IPSU Remora flight spare
  - Complete 4 bottle assemblies for ATV manifest
  - Completed build of the surveillance camera spacer and camera evaluation
- **IPSU/Camera upgrade**
  - Updated IPSU h/w concept
  - Initiated IPSU and camera specifications

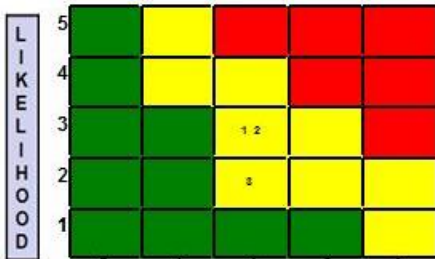
# 2012 Deliverables List

## 101 Fluids and Combustion Facility, MIP, TSC, LMM, MDCA

Deliverable	Planned	Actual	Note
Smoke Detector spare	Feb-2012	4/2012	
ATCU Fan Assemblies (2) spares	Apr-2012	4/2012	
ATCU Fan Filter Electronics Box spare	Apr-2012	4/2012	
EEU spare	Apr-2012	4/2012	
GCIP flight unit	Jun-2012		Assembly and test completed. Verifications in process, delivery for HTV-4
MDCA Avionics Package spare	Jun-2012		Assembly and test completed. Verification closure carry forward to next period of performance
CIR Windows (2) spares	Jul-2012	3/2012	
LMM Control Box spare (No Environmental)	Jul-2012		Out of plan board vibe required. carry forward to next period of performance
QD Lubrication Kit (if required)	Jul-2012		Concept coordinated with ISS Qdirt. Final design pending program feedback
IPSU spare - Remora	Sep-2012		Assembly complete EMI test scheduled for January
Focus Prism spare	Nov-2012	11/2012	
DCM spares (2)	Nov-2012	11/2012	
ICM spare	Nov-2012	11/2012	
MDCA Color Camera spare	Nov-2012		EMI test re-schedule for January to accommodate SAMS EMI facility request
GIU LCTF	Dec-2012	11/2012	
Common IAM spare	Dec-2012	11/2012	

# Risk Matrix - FCF

## 101 Fluids and Combustion Facility, MIP, TSC, LMM, MDCA



### CONSEQUENCES

#### Criticality

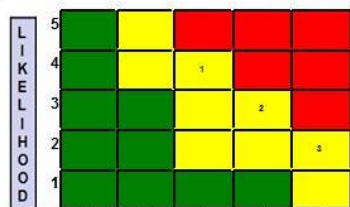


#### L x C Trend

- ↓ Decreasing (Improving)
- ↑ Increasing (Worsening)
- UnChanged
- \* New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
FCFSE-026 → Technical Beltram	LMM GIU does not fully emulate the flight unit	Given that the LMM GIU does not fully emulate the flight unit; the possibility exists that future LMM flight experiments will not operate correctly.	3	3	<b>Mitigate:</b> Plan is to review LMM GIU non-flight design issues, and add task to update LMM GIU to the next DO period of performance. <b>Status:</b> 12/21/11 - Task has been added to the DO to upgrade to LMM GIU. 01/11/12 - No updates at this time. 02/17/12 - The LMMGIU has been assessed and the upgrades needed to emulate the flight system have been identified. Additionally, microscope motor functions are in the process of being repaired. 03/28/12 - Risk has been reviewed and there are no changes to its status at this time. 04/23/12 - Currently preparing trouble shoot procedures for LMM motor functions. 06/18/12 - This risk was reviewed and there are no updates at this time. 07/27/12 - Turret motor problem diagnosis has been completed and repair for it is in process. ECD: 07/02/2012
FCFSE-029 * Technical O'Toole	ICM failure	Given that the ICM may fail; then there will be a significant impact to the back lit imaging science instrument to occur.	3	3	<b>Mitigate:</b> Develop ICM spares. <b>Status:</b> ECD: 04/30/2013
FCFSE-014 ↓ Technical Beltram	IOP removable hard drive shelf life	Given that the IOP removable hard drives have a limited shelf life; then there is the possibility that these hard drives won't work over time and the FIR and CIR racks will not be able to provide support for their payloads to perform science operations will occur.	2	3	<b>Mitigate:</b> Implement a procedure to re-format the hard drive on-orbit to minimize loss of magnetic field encoding data on the disk. <b>Status:</b> 04/23/12 - Currently on track for the development of the formatting procedure. 06/18/12 - This risk was reviewed and there are no updates at this time. 07/27/12 - Formatting being developed. 09/12/12 - Documented format procedure is in process of being developed. ECD: 08/30/2013

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CONSEQUENCES

**Criticality**

**High** (Red)

**Med** (Yellow)

**Low** (Green)

**L x C Trend**

↓ Decreasing (Improving)

↑ Increasing (Worsening)

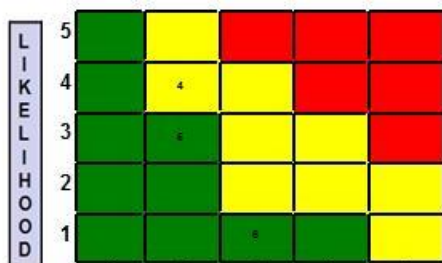
→ UnChanged

\* New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
MDCA-012 ★ Technical O'Toole	FLEX-2J Droplet Size Repeatability	Given the tolerance on droplet reproducibility has not been demonstrated there is possibility that we will not meet the reproducibility requirement	4	3	<b>Mitigate:</b> Review science requirement with JAXA and determine the capability of the flight hardware to meet the science requirement. <b>Status:</b> 06/18/12 - Not started. S/W engineering resource not available as of 6/15/2012. Expected closure date is Aug 31, 2012. 09/12/12 - Awaiting for the revised MDCA S/W to complete the last mitigation task. ECD: 10/31/2012
MDCA-011 ★ Technical O'Toole	FLEX-2J Deployment Validation	Given that we cannot verify multiple droplet deployments in a 1G environment there is possibility that not all science will be met	3	4	<b>Mitigate:</b> Develop a robust 1G validation program <b>Status:</b> 06/18/12 - Not started. S/W engineering resource not available as of 6/15/2012. 07/27/12 - S/W developer resource got a late start. 09/12/12 - Pushed out the first mitigation task by one month per monthly RMWG. ECD: 10/31/2012
MDCA-007 ★ Cost O'Toole	Lack of on-orbit spare avionics box	Given that there is no flight spare MDCA avionics box on ISS and there are no plans or budget to build a flight or GIU MDCA avionics box; then there is the possibility that, if the MDCA avionics box becomes inoperable, a complete loss of the ability to obtain FLEX-2 science will occur.	2	5	<b>Mitigate:</b> A plan to build a flight spare avionics package is authorized under the current DO with delivery planned for the 4th quarter of 2011. <b>Status:</b> 08/24/11 - Still on schedule to deliver flight spare avionics box. 10/04/11 - The project is still targeting the flight spare avionics delivery in December of 2011. 11/15/11 - Delivery of the assembly is projected for February 1, 2012. Verification and manifest is expected to be included in the follow-on DO period of performance. 03/07/12 - Flight spare MDCA avionics box is in the process of being built per ZIN Tech MWO. 03/28/12 - Flight spare avionics box is tentatively scheduled for several environmental tests as follows: Vibe & EMI in May of 2012 and Thermal Cycle in June of 2012. 04/23/12 - Flight spare avionics box is in the process of being built. 06/18/12 - Assembly complete. Vibration and EMI testing Completed. Thermal Cycle testing scheduled for June 2012. ECD: 09/28/2012

# Risk Matrix - FCF

## 101 Fluids and Combustion Facility, MIP, TSC, LMM, MDCA



### CONSEQUENCES

#### Criticality

High

Med

Low

#### L x C Trend

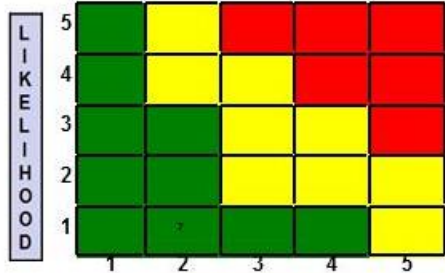
↓ Decreasing (Improving)

↑ Increasing (Worsening)

→ UnChanged

★ New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
MDCA-013 ➡ Technical O'Toole	FLEX-2J Droplet Imaging Resolution	Given that there is limited performance data for the droplet imaging camera at 60 frames per second there is possibility that we will not meet the resolution requirement	4	2	<b>Mitigate:</b> Review science requirement with JAXA and determine CIR h/w capability. <b>Status:</b> 06/18/12 - Resolution test pending 60 fps camera configuration. Initial attempt to operate at 60 fps failed. Expected closure date is Aug 31, 2012 per O'Toole's e-mail Friday 6/15/2012. 09/12/12 - Demonstrated that there is a 60 fps capability. The resolution test still needs to be done. ECD: 08/31/2012
MDCA-010 ➡ Schedule O'Toole	FLEX-2J SRD not signed	Given that the FLEX2J SRD is not signed at PDR there is a risk that project cost and schedule will not be met.	3	2	<b>Mitigate:</b> Document requirements as understood via previous TIMs and coordinate with JAXA to obtain concurrence <b>Status:</b> 06/18/12 - Reviewed updated draft document with JAXA rep. Signature parties identified per O'Toole's e-mail Friday 6/15/2012. 07/27/12 - FLEX-2J is still in work by the PI. Latest JAXA comments have been incorporated into the SRD. 09/12/12 - GRC Science, JAXA Science, as well as GRC Project management & Zin Engineering have all signed off on SRD. Awaiting for NASA HQ to sign off and approve. ECD: 09/28/2012
MDCA-014 ➡ Technical O'Toole	ICE-GA combustion by-products	Given that the hexanol combustion by-products are not established there is the possibility that the ICE-GA hexanol fuel may not be allowed on ISS.	1	3	<b>Mitigate:</b> The project intends to perform by-product testing on hexanol to show it is compatible with ISS vents requirements and meets toxicity limits. <b>Status:</b> 09/12/12 - Test has been initiated. ECD: 10/31/2012



CONSEQUENCES

Criticality

L x C Trend

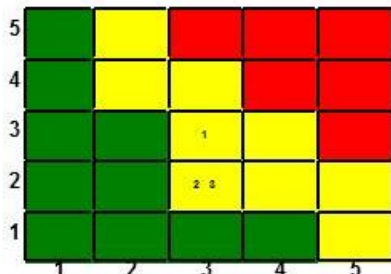


- ⬇ Decreasing (Improving)
- ⬆ Increasing (Worsening)
- ➡ UnChanged
- \* New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
MDCA-015 ➡ Schedule O'Toole	Unapproved ICE-GA Science Requirements Document	Given that the ICE-GA SRD is not signed at PDR there is a risk that project cost and schedule will not be met.	1	2	Mitigate: Get the SRD signed by both Italians and Project. Status: ECD: 09/28/2012

# Risk Matrix - FCF

101 Fluids and Combustion Facility, MIP, TSC, LMM, MDCA



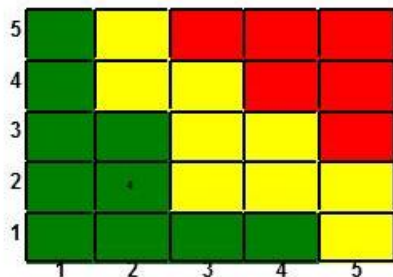
## Criticality



## L x C Trend

Decreasing (Improving)  
Increasing (Worsening)  
UnChanged  
New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
TSC-004	Lack of support depth	Given that there is no more than 1 subject matter expert in the areas of TSC System administration, FCF Ground software, and FCF data post-processing, there is a risk that FCF will not be supported adequately to ensure mission success.	3	3	Status: ECD: 12/28/2012
Cost					
TSC-002	DICES III voice loop system obsolete	Given that DICES III system hardware is at end-of-life, there is a risk that voice loop services will not be available to support mission operations.	2	3	Status: ECD: 12/28/2012
Technical					
TSC-003	Video System Difficult to Support	Given that the Grass Valley video matrix and AMX video switch system uses an unmaintainable and undocumented configuration, there is a risk that all video channels may not be available to support mission operations.	2	3	Status: ECD: 12/28/2012
Technical					



### Criticality



### L x C Trend

- Decreasing (Improving)
- Increasing (Worsening)
- UnChanged
- New since last month

Risk Id	Risk Title	Risk Statement	L	C	Approach
TSC-001	Stale TSC documentation and not up to date	Given that documentation has not been updated as physical changes are made at the TSC, there is a risk that troubleshooting and maintenance will not be properly performed.	2	2	Status: ECD: 12/28/2012
Technical					

# 102 Acceleration Measurement Program (AMP)

*Engineering Lead* Jennifer Keller & Ray Pavlik

**NASA Program Manager:** Tom St. Onge

**NASA Project Lead:** Kevin McPherson / Bob Hawersaat



**SAMS Objective:**

- Provide acceleration measurement systems that meet the requirements of the researchers on board the International Space Station.
- SAMS measures the acceleration environment in the 0.01 to 400 Hz range for payloads.

**MAMS Objective:**

- Provide acceleration measurement system that measures the Quasi steady and vibratory acceleration data in the 0.00001 to 100 Hz frequency range on board the International Space Station (ISS) vehicle

**PIMS Objective:**

- Provide acceleration measurement data to Principal investigators who conduct scientific research on board the International Space Station.
- The SAMS acceleration measurement system provides the raw data that PIMS uses to provide analysis to the Principal Investigators. SAMS measures the acceleration environment in the 0.01 to 400 Hz range for payloads.



WBS	Milestone	Start	Baseline	Projected	Actual	Schedule Variance
1.8.9	SE Cable – at least 144 inches in length	7/12		12/12		
1.8.10	Spare TSH-ES and TSH-ES 08 for MSG	7/12		12/12		

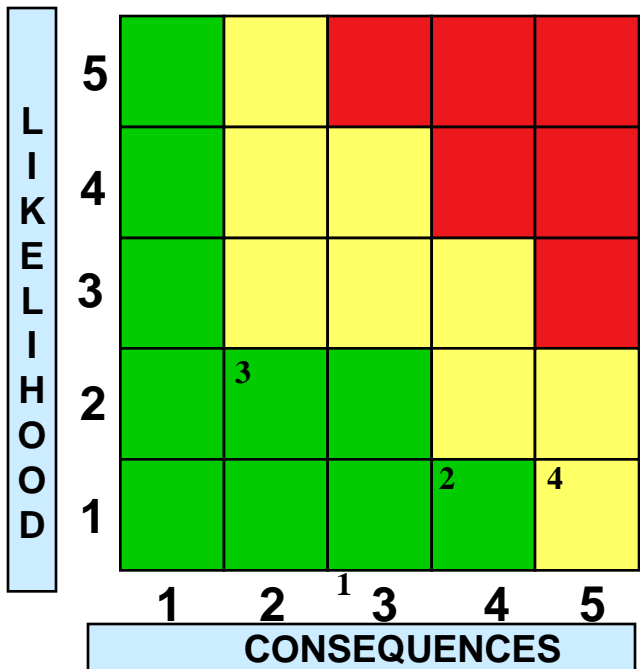
# Issues and Concerns

## 102 AMP (SAMS, MAMS, PIMS)

Issue	Potential Impact	Action Plan	Resolution Date
Network issues onboard delaying EE-F05 boot process	EE-F05 not booting	Work with DMC to help determine network issues.	Moved sensor back to EE-F05 and the network troubles have not appeared as of late. Continue to work with Express if/when it does occur.
Crew office cannot properly torque the SAMS MSG baseplate into the MSG WV	Not a good surface mount for the SAMS TSH-ES	<ol style="list-style-type: none"> <li>1. ECO the SAMS AIDD to call out the torque values for the baseplate</li> <li>2. Request in writing the issue and why it cannot be performed.</li> </ol>	<p>9/15/09 – telecon held with MSG. It was decided that the fasteners on the SAMS baseplate for the TSH-ES will not be torqued. Integrated Safety Hazards are being updated on the MSG side, and SAMS is clarifying a SAMS safety hazard.</p> <p>TSH installed in MSG and working with SODI. Crew procedures said to be hand tight.</p>
TSH-ES S/N 08 failed the failed the SAMS TSH-ES Functional Acceptance Test	TSH-ES S/N 08 will not fly on ATV-4	<ol style="list-style-type: none"> <li>1. Work the NCR SAMS-NCR-271</li> </ol>	April 2013

# Top Risks

## 102 AMP (SAMS, MAMS, PIMS)



Criticality	LxC Trend	Approach
High	Decreasing	M-Mitigate
Med	Increasing	W-Watch
Low	Unchanged	A-Accept
	New	R-Research

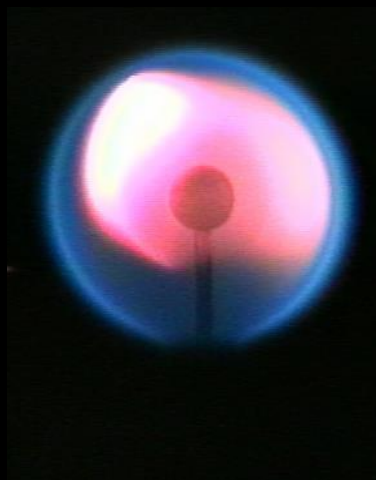
Approaches: Mitigate, Watch, Accept, Research

Risk ID	Risk Title	Risk Statement	L	C	Approach
DO102-1	TSH-ES wire size	Wire sizing could limit usage of the TSH-ES. The use of 12 gauge wire would increase the size of the TSH. Many power suppliers have 20 amp breakers.	1	2	<b>Watch:</b> Will address risk with inline breakers if a customer requires it. Not a problem for FIR or CIR. <b>Status:</b> Does not affect FCF or MSG. Will address when there is a user. <b>Close date:</b> Future User
DO102-2	Commanding Issue	NCR 237 identified: The laptop may lockup when commanding to the TSH-ES that is running at 400 Hz.	2	3	<b>Watch:</b> The system will need to be rebooted only. Alternative means to address this issue in future software builds will be considered. 400 Hz mode not a normal operating mode. <b>Status:</b> Waiting for funds to consider s/w fix <b>Close date:</b> On going
DO102-3	SAMS Sparing	SAMS PCS hardware not supported by the ISS program.	3	2	<b>Mitigate:</b> Ghosting function for hard drives in place. Laptop shells, spare hard drives and floppy drives have been set aside on ISS for SAMS use. <b>Status:</b> Need to configure one more set of spare hard drives <b>Close date:</b> 04/09
DO102-4	SAMS Fan Regulator	SAMS RTS Drawer #2 fan regulator frequency varies	2	4	<b>Watch:</b> Fan speed has shown the variable frequency for several months and has not shown any distinct changes in behavior over that period of time. <b>Status:</b> Need to configure one more set of spare hard drives <b>Close date:</b> 04/09

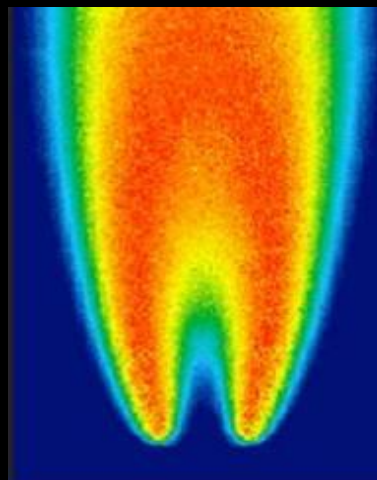
December 2012



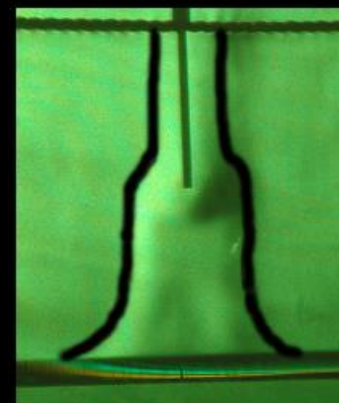
*s-Flame*  
(drop test)



*Flame Design*  
(drop test)



*CLD Flame*  
(aircraft test)



**2850 V**

*E-FIELD Flames*  
(1g schlieren)

**Manager:** Brian Borowski

NASA Program Manager: Tom St. Onge  
NASA Project Lead: Mark Hickman  
NASA Project Scientist: Dennis Stocker

SpaceDOC 110 encompasses the initial development phase of ACME including requirements and verification development and planning, flow system breadboard interface with existing FOMA breadboard and color camera trade studies to ultimately provide a new diagnostic capability for CIR. Work on Engineering Model design is included following completion of Preliminary Design Review in January of 2011.

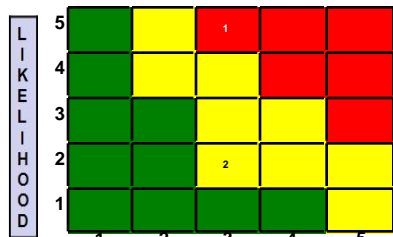
Issues	Potential Impact	Action Plan	Resolution Date
There are some requests to the project from the Project Scientist to change Science Requirements	If these changes are approved the ACME budget and schedule will be impacted. The longer the decision process takes, the more severe the impact will be as the flight design continues moving forward	A review panel was convened by NASA Project Management to discuss the potential changes. Actions were distributed to help make a determination	?
Following functional testing of the E-Field Subsystem and EMI testing of the same subsystem some requirement compliance issues have arisen with regard to rise times and energy levels	Unable to meet science requirements	Review Board has been convened to further discuss and provide guidance to management	12/12
Due to the end of the contractual POP, no procurements can be placed until the extension is in place	Delayed completion of project milestones	Proposal is being reviewed and modified	1/13

- Continued build of EM Avionics Package
- Continued build of Flight Avionics Package
- Met project milestone for December with the completion of the build of the EM Cube sub-system
- Build of an EM Mass Flow Controller Assembly is underway
- Design of CIA diagnostic sub-systems are wrapping up and moving into a procurement cycle

WBS	Milestone FY12	Credit	Start	Baselined	Projected	Actual	Scheduled Variance
1.1	Interim Design Review	100% package complete	May 2012	June 2012		June 2012	



## Task Level Risk Assessment



CONSEQUENCES	
Criticality	L x C Trend
High	↓ Decreasing (Improving)
Med	↑ Increasing (Worsening)
Low	➡ UnChanged
	* New since last month

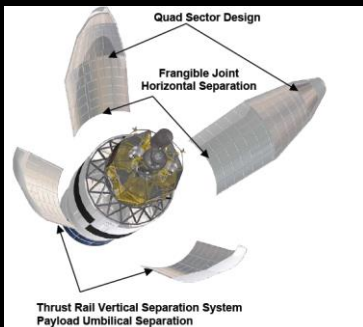
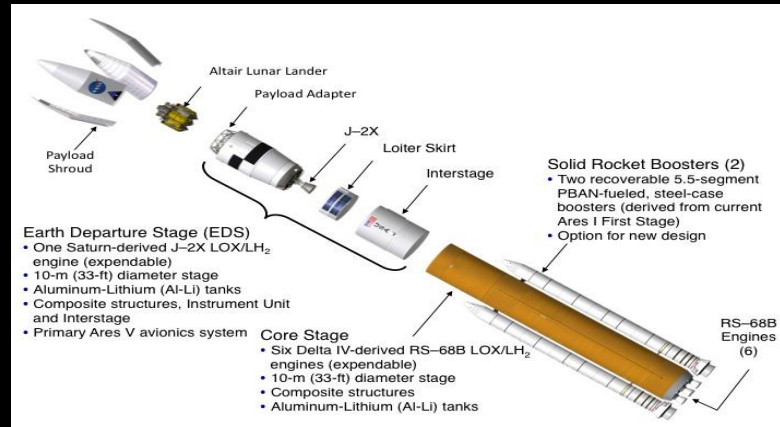
Risk Id	Risk Title	Risk Statement	L	C	Approach
ACME-014 ↓ Technical Rogers	IPSU to IOP image transfer rates take too long	Given that the current data transfer rates from the IPSU to the IOP is severely limited, transfer of ACME data may take an unacceptable amount of time and may reduce obtainable science for the allotted operational time on board ISS.	5	3	<b>Watch:</b> Need to keep an eye on this and follow up with the CIR team to keep updated on transfer improvements. <b>Status:</b> 12/13/11 - The FCF team has improved transfer rates by utilizing both IOP hard drives. The FCF team needs to provide quantitative data transfer rates. 03/27/12 - Risk reviewed by the ACME team and no status updates at this time. 05/08/12 - ACME RMWG has reviewed this risk and there are no updates at this time. 06/12/12 - Risk was reviewed at the monthly ACME RMWG and there are no updates at this time. 07/27/12 - Negotiations to fund an IPSU upgrade with increased data transfer rates has been initiated. 09/12/12 - Currently the IPSU to IOP transfer rate is approx 1.3 Mbps. The IPSU redesign concept calls for a direct downlink from the IPSU directly to ground with ISS downlink capability at 20Mbps. FCF project is submitting a funding request to support development of the concept. 09/18/12 - ACME needs a minimum of 10 Mbps. 10/16/12 - This was reviewed in the monthly RMWG with nothing new to report. 11/20/12 - The FCF NASA PM has obtained funding for a new IPSU design with the ACME data transfer rates as part of the design criteria. <b>ECD:</b> 12/31/2012
ACME-008 ➡ Technical Gobeli	E-field emission exceedences	Given that there might be e-field exceedence emissions; then there is the possibility that the EMI requirement will not be met and ACME hardware would be adversely effected causing diminished science to occur.	2	3	<b>Mitigate:</b> The ACME team will be intensively working with the EMI lab to determine what if any EMI exceedences occur to meet its EMI requirement and minimize any impact on the hardware. <b>Status:</b> 1/11/11 Planned testing has been delayed due to funding. 11/23/10 No changes or updates at this time. 9/14/2010 No changes or updates at this time. 05/03/11 - 5/3/2011 - This risk will be on hold until the Engineering Model is completed. 05/31/11 - 5/31/11 - Nothing new to report. 02/14/12 - Still appear to be on target for test date. 06/12/12 - EMI testing has begun and should be completed by the end of June 2012. 08/21/12 - EMI report # GRC-EMI-RPT-331 has been written. 09/18/12 - ACME Project Scientist is in discussions with the ACME team about potential

# 119 Ares V Payload Shroud Element (PSE) Project

**ZIN Manager:** Michael Johanson

ZIN Engineering Lead: Bill Dial

**NASA Project Manager:** Gerry Sadler



SpaceDOC 119 encompasses evaluation of potential manufacturing approaches focusing on the Heavy Lift Payload Shroud but not be limited to (e.g. can include other element composite dry structures). Approaches may include: existing composite manufacturing sites, MAF, and new sites. ZIN and our subcontractor Zero Point will identify needed composite manufacturing assets and capabilities to support current Heavy Lift Vehicle concept and associated requirements based on manufacturing assessments done by the NASA ESMD ACT project. The scope of the analysis shall include logistics and supply chain requirements.

Issue	Potential Impact	Action Plan	Resolution Date
None			

- Continued to work Shroud Structural Analysis and Design task.
- A no cost extension was implemented extending the POP to 3/31/2012.

# DO-128 Communications, Navigation, and Networking Reconfigurable Testbed (CoNNeCT-2)



ZIN Project Lead: Ray Pavlik  
ZIN Software Lead: Jennifer Keller

**NASA Project Manager: Diane Malarik**  
**NASA Deputy Project Manager: Mike Zernic**  
**NASA GRC PI: Rich Reinhart**  
**NASA GRC Deputy PI: Sandy Johnson**

- An on-orbit, adaptable, Software Defined Radios (SDR)/Space Telecommunications Radio System (STRS)-based testbed facility to conduct a suite of experiments to advance technologies, reduce risk, and enable future mission capabilities on the International Space Station (ISS).
- DO-128 Scope of Work includes:
  - Performing configuration management activities, including software.
  - Remaining development of the CoNNeCT Flight and Ground System Software.
  - Integration with the Payload Operations Integration Center (POIC) and SCaN-provided SN, NEN, and NISN.
  - Sustaining Engineering and Operations of the Flight and Ground System.
  - Experiment Integration and Operation

Issue	Potential Impact	Action Plan	Resolution Date
None			

- Subtask A CM/DM
  - Reviewed, formatted, and released multiple Documents, Process Plans, Change Requests, and NCRs.
  - Supported GIU drawing updates.
  - Processed for storage as-run Mission Operations Procedures and GIU documents.
  - Working with PIs to create a new Experiment Plan Template for use on New Experiments.
  - Reviewing and updating the Build and Release Procedure to current process.
  - Verifying the builds performed using different SCM accounts and their results.
- Subtask B SE&I, Software, and Experiment Integration
  - GIU Maintenance (GRC-CONN-PLAN-0895) - Downloaded Avionics Files on a weekly basis.
  - JPL GSE I/F for the GIU – Assembly and fabrication is complete.
  - GIU TWTA Pre Amplifier - Drawings due by late January.
  - GIU GPS Testing.
    - Conducted testing to determine why the signal at L5 Band is ~20db below that of the signal at L2 Band.
    - Determined that the antennas in the Hat Coupler Box are specifically tuned for L1 and L2 with L5 being about 20db down.
  - EFEP
    - It appears that a configuration of the EFEP was changed during a running test. TSC personnel questioned if someone might have accidentally touched the GUI, causing the configuration change. The EFEP control PC was modified with a new user sign-on and password. The system will be monitored.
    - Work with the EFEP team on the new Experimenter's EFEP system design requirements and necessary components.

- Subtask B SE&I, Software, and Experiment Integration (continued)
  - GIU Remote Operations
    - An additional PC was required for remote control and operations of the RF test equipment running with the G.I.U.
    - Several PC's (taken out of service in the STRS TVL) were looked over and a complete system was set-up for dual monitors and ops. The PC was installed with the G.I.U. test equipment in Bldg 333 and tested OK.
  - WSC
    - Work on assembling a list of and the equipment that will be needed at the White Sands facility during ScaN Testbed commissioning.
    - Attend telecons and email with WSC personnel concerning the specifics regarding RF connections and test equipment set-up at the WSC facility.
    - Configure a laptop as a remote control and data acquisition PC and order parts needed for remote control.
  - Completed trouble shooting and resolution to the DAS backup and archival program, Amanda. A misplaced startup file was restored to the correct directory. Since then there have been no problems when the system has been totally powered down and up.
  - Continued updating the testbed test equipment calibrations. Obtained extensions for several units that are needed for ongoing Dry Runs. These will be sent for calibration when available.
  - Experiment 25A TDRS-K
    - Conducted two TDRS-K integration telecons
    - The Expt 25A Experiment Plan was formally reviewed and released for signature.

- Subtask B SE&I, Software, and Experiment Integration (continued)
  - Initiated discussions with the SEI Lead on the specific mechanism for documenting Experiment-specific requirements (primarily software). The initial thought is to extract/decompose the functional needs in the experiment plans into Experiment-unique requirement documents that are then applied to the SCan TB software team.
  - Ground Software
    - Worked on CRs for CTADS and CESDB updates.
    - Worked on the Store Telemetry And Retrieval System (STARS) requirements and design description
  - Flight Software
    - Completed the move of the SDSs from B333 to ZIN SW Lab. All systems setup including a new rack UPS system.
    - Continued work on the Avionics Experiment Interface User's Guide and software.
    - Continued to troubleshoot build differences. Created 2 custom scripts that allow building the kernels the same as the flight build. Discovered that our build process is OK. Differences in kernels are not due to user accounts and that flight build can be recreated by more than one user.
    - Submitted PAS regression test plan to CM for formal review.

- Subtask C Flight & Ground Software
  - As of FY2013, flight and ground software activities have transitioned to WBS 01-03.
- Subtask D Mission Operations
  - Worked with PPM, Prep-OC, and TCO to add SCAN Testbed activities to timeline
  - Prepared weekly PPM inputs and the weekly POIC Briefing
  - The GD and Harris VTRs were completed successfully.
  - Reviewed the draft test procedure for the Avionics scripts. Discovered that some of the scripts were not useful to Operations and some should be modified to make them more useful. Will work with the Software team to better define the functions and scripts we need.
  - Reviewed and processed PIRNs.
  - Processed a Change Request for the Mission Operations Modules (GRC-CONN-OPS-0912) document.
  - Created a new Configuration Data Sheet template that allows for easier tracking of files uploaded to and downloaded from the flight system. This updated template will be included in the update to the Data Management Plan that will be worked on in the coming month.
  - Continued working on: debugging issues with the ECL and FSCC configurations on the GRC SFEP and WSC SFEPs; determining why bursts of errors are being observed on the JPL Return data stream from WSC at 18 and 24K data rates; and why frames are being dropped on the Harris Forward link. In addition, determining why the FSCC module on the GRC SFEP and WSC SFEP ceases to output the data stream after long duration tests using the GD and JPL EFEP.

- Subtask D Mission Operations (continued)
  - TDRS AT Resolution – Analysis and Reporting: Two tests in duplex AT (autotrack) mode were conducted: one was successful and one showed a failure in the TDRS AT response. This testing revealed the same interrupted TDRS AT response observed previously. The initial data sets were collected and transmitted to the analysis team at Goddard supporting the space network. Upon implementing their recommendations to operate in return link PT (program track) mode (LynxCAT AT disabled), the full TDRS AT response could be observed and further testing revealed that the TDRS AT mode makes an update to the PT trajectory every 2 minutes. This was causing the break in the SCAN return link AT. This was subsequently corrected on the TDRS AT side by ensuring angle limit checking is enabled. Testing resumed and the majority of duplex AT operations performed properly. However, recent Week 12 testing indicated two off-nominal forward link APQM turn downs caused by the TDRS AT. A data analysis indicated that the APQM turndown was exactly correlated with the departure of the TDRS AT angles from the PT trajectory. This data was relayed to the Goddard analysis team and they concurred with the observation and are reviewing the performance at present. The outcome will be reported next month.
  - APS Commissioning – Testing: The APS commissioning began in full force this month. The initial testing during Week 10 was aimed at basic TLE staleness testing. It was decided that all tests be conducted in duplex mode (RX/TX with full AT mode). However, as discussed above in the TDRS AT Resolution section, the testing was sidetracked with an effort to correct the TDRS AT response. This was successfully concluded and the duplex AT testing was accomplished relatively easily and the APS commissioning test matrix was continued. The testing successfully moved through: static and dynamic error testing, AT gain testing, VSIS testing, lock break testing, ST (spiral track) lap testing. The remained of the test matrix will be performed in Weeks 17 and 18 and will be reported next month. At present, the APS algorithm is performing as expected.

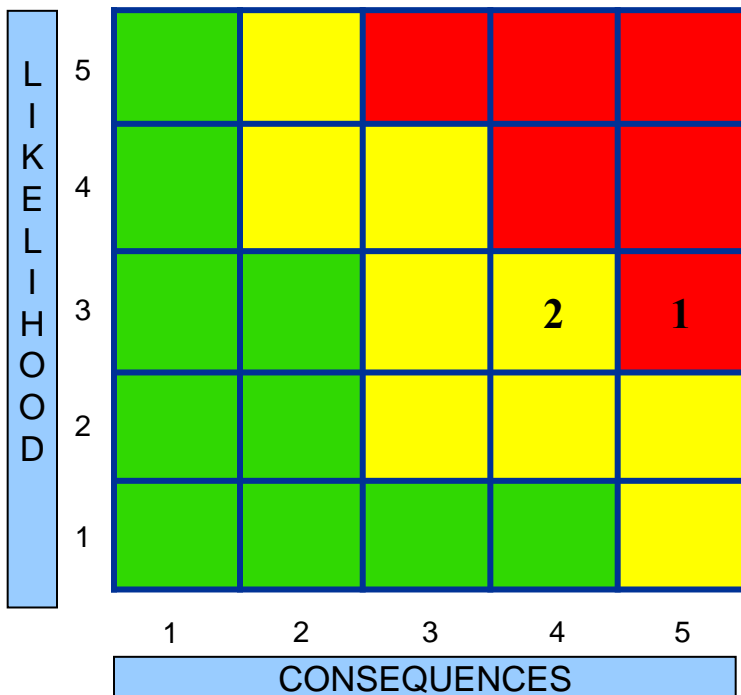
- Subtask D Mission Operations (continued)
  - Experimenters ISS to ECI Transformation: As requested by Jim Lux and directed by the SCAN MOM, work has begun on the model to generate a transformation to take any point on the MGA and HGA antennas when articulated in AZ and EL to the earth centered inertial (ECI) coordinates. The model is being prepared in MathCAD but may be coded for direct use in the LynxCAT SK Toolbox. Initial efforts are aimed at generating the SCAN to ISS transformations (translation and rotation). Next month, the motion of the gimbal arms in the translation will be resolved. The analysis should be concluded by end of January.
  - Created a final draft of the Harris SDR Familiarization Training Module and forwarded this to applicable SCaN TB team members for review.
  - Completed final technical assessments of the GD SDR internal temperature offset. The results were presented to the SCaN TB NRB and approval was granted to make changes to the calibration equation coefficients for both the flight system and the GIU.
  - Met with the MO team to review an open request for derivation of a transformation matrix that would provide pointing vectors for the various SCaN TB antennas in terms of both the ISS primary coordinate system, as well in terms on an earth centered inertial coordinate system. A teleconference was conducted with the JPL requester to better elaborate on the request.
  - Completed a final version of GRC-CONN-RPT-0949, Avionics CPU Utilization Test Report, and released it through SCaN TB CM for formal review. Dispositioned comments received and submitted final document back to SCaN TB CM for the signature cycle.

## Hardware/Software Deliverables

No.	Item Description	Planned Completion Date	Actual Completion Date	Note
a)	Subtask A –CM/DM: Configuration Management and Tracking System (CMTS)	December 31, 2012		Hardware – This will transition to the next period of performance for this DO.
b)	Subtask C – Flt & Grnd SW: Verified Post-Ship Flight Software for subsequent upload to the Flight System	July 2012		Software – This will transition to the next period of performance for this DO.
c)	Subtask C – Flt & Grnd SW: Verified Ground Software required for JAXA Ground Processing	February 2012	February 2012	Software
d)	Subtask C – Flt & Grnd SW: Ground Software to support Mission Simulations	Q3 FY12	July 12, 2012	Software – Final Mission Simulation held 07/12/12.
e)	Subtask C – Flt & Grnd SW: Verified Ground Software, suitable for use during C/O & C	June 2012	August 2012	Software - SCaN Testbed operated for first time on-orbit on 08/13/2012.
f)	Subtask C – Flt & Grnd SW: Verified Ground Software, suitable for use with Post-Ship Flight Software	July 2012		Software – This will transition to the next period of performance for this DO.
g)	Subtask D – Mission Ops: Control Center Equipment for use during Mission Simulations and Mission	Q3 FY12	October 2012	Hardware – GPS System delivered 10/21/02
h)	Subtask D – Mission Ops: Data Distribution Services Software	May 2012		Software – This will transition to the next period of performance for this DO.

# DO-128 Risk Matrix Overview

STATUS AS OF: 11/17/12



LxC Trend	Rank	Approach	Risk Title
→	1	M	Underfunded Operations and Experiments Phase
→	2	M	Experimenter Software Interface

Criticality	L x C Trend	Approach
High	↓ Decreasing (Improving)	M – Mitigate
Med	↑ Increasing (Worsening)	W – Watch
Low	→ Unchanged	A – Accept
	N New	R – Research
		C – Closed